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Running title: Umbilical cord mercury as exposure biomarker

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## Abstract

Biomarkers are often applied to assess prenatal exposure to methylmercury in research and surveillance. In a prospective study in the Faroe Islands, the main exposure biomarkers were the mercury concentrations in cord blood and maternal hair obtained at parturition. We have now supplemented these exposure biomarkers with mercury analyses of umbilical cord tissue from 447 births. In particular when expressed in relation to the dry weight of the tissue, the cord mercury concentration correlated very well with that in cord blood. Structural equation model analysis showed that these two biomarkers have average total imprecisions of about 30%, which is much higher than the laboratory error. The imprecision of the dry-weight-based concentration was lower than that of the wet-weight-based parameter, and it was intermediate between those of the cord blood and the hair biomarkers. In agreement with this finding, regression analyses showed that the dry-weight cord mercury concentration was almost as good a predictor of methylmercury-associated neuropsychological deficits at age 7 years as was the cord blood mercury concentration. Cord mercury analysis can therefore be used as a valid measure of prenatal methylmercury exposure, but appropriate adjustment for the imprecision should be considered.